REVIEW

Becoming an effective learner

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Abstract

The teaching of medicine and the expectations of trainees has changed enormously over the past two decades in parallel to changes in medical technology, advances in information technology and the provision of healthcare. With a shortened time in medical training efficient learning is ever more crucial and the skills with which to optimise and enhance our learning opportunities are discussed.

Both the way we teach medicine and the expectations of our trainees have changed enormously over the past 20 years. This is partly due to a seemingly never-ending expansion of information available at our fingertips, with data being generated at a rate that even the most diligent among us struggles to keep apace. This, together with a new generation of junior doctors within a modernised training system that has moved from experiential, apprentice-type learning to more structured curriculum-driven, work-based training, has reinforced the vital need of doctors at every level of their training and beyond to recognise the importance of life-long learning.

The career progression of junior doctors has always required evidence of a sufficient knowledge base to pass through to the next level of training. Previously assessed by written exam, with modernisation of medical training, evidence of competencies are sought in both formative and summative assessments. With a contracting time in training 'efficient learning' is crucial. To be able to teach current trainees how they can be effective learners with the aim of enabling them to develop their skills and enhance learning throughout their entire career is one of the key ingredients to being a successful, safe and competent medical practitioner.

The phrase 'use it or lose it' with regard to our higher cognitive abilities is not a new concept, but what is the evidence for cerebral stimulation keeping at bay neuronal loss? Can we somehow use

our current understanding of potential changes in grey matter induced by training to motivate our learning?

It is widely accepted that if we keep our brains active we can reduce the decline in cognition during old age. Cognitive rehabilitation has been shown to improve function in healthy older adults¹ and may improve memory performance in people with mild cognitive impairment.² However, it is only relatively recently that evidence of a structural change in grey matter induced by training has been shown. Subjects learning juggling skills had a selective structural change, albeit transient, in the brain areas associated with the processing and storage of complex visual motion.³ The researchers suggest their findings indicate that learning-induced cortical plasticity is also reflected at a structural level. With knowledge of our learning needs and that successful learning can induce structural brain changes plus awareness that brain activity is directly related to the level of stimulation, optimising our personal learning potential by understanding our own preferred learning style is the key to drive our learning.

Moreover, once we have gained an understanding of our preferred learning styles, the most able learners are those with plastic learning styles, those adaptable learners who can move out of their preferred learning styles dependent on the required learning.

Identifying learning style: what is our most effective mode of learning?

Learners adopt different approaches to learning. Four main learning style preferences have been identified in the form of observers, thinkers, deciders and doers. Honey and Mumford⁴ describe these styles alternatively as reflectors, theorists, pragmatists and activists. Reflectors like to focus on facts and enjoy observing others and learning from other peoples' experiences. They will learn less well if given no preparation.

Theorists like to research and read about new topics and can thrive in structured teaching environments with clear aims. They can fare less well in a learning situation involving feelings and emotion. Pragmatists like clear structure and practical work but fare less well in situations requiring flexibility to solve problems and can struggle with making connections between concepts and theories. Finally, activists learn best by discovering things themselves and cope well with change. They like working with others. They tend to fare less well in large group lecture settings when they have to read, write or think on their own. However, a single learning style preference is not used to the exclusion of others, and our learning styles will change depending on the task to be performed. Identifying our preferred learning style will nonetheless improve awareness of our strengths and limitations in our learning. Practical example: with new endoscopic kit a reflector is more likely to want someone to show them how it works and to read the instructions carefully before using; a theorist may well wish to know about the optical science behind the kit; a pragmatist may wish preferentially to try it out for themselves straight away; an activist may well have requested the trial of kit in the first place. These 'learning styles' will impact on the way each individual processes information but also depend on personal cognitive, emotional and psychological behaviours. One learning style theory is based on the well-known personality assessment tool, the Myers & Briggs indicator^{5,6} (box 1).

Individual learning styles are likely to include a combination of these personality dimensions. In addition, some of us learn best by hearing information, others by seeing it and others by task performance. Determining our own individual learning style is another step forward in becoming an effective learner. Moreover, the understanding that, for example, 60% of people will be extrovert and 40% introvert learners also helps us in group teaching situations whether as a teacher or a student, with a greater awareness of the different learning styles of our peers. To conclude, with an understanding of our own learning style and personality traits we can optimally direct our learning.

Identifying learning needs: how do we know what we need to learn?

Our learning needs depend on the context in which we work, our expected role and responsibilities within

that job as well as the individual knowledge and skills we bring to each post. There will be parallel learning needs of junior doctors at a similar level of training but also separate individual learning needs dependent on their career choice, personality and learning style. The organisations in which we work, and their expectations of us as medical practitioners, are also important in understanding our learning needs. There are a number of ways to identify our needs but we could start with four simple questions (box 2).

The extent of learning required depends on our level of responsibility for a particular role or task. We may delegate or contribute. Do gastroenterology trainees need to learn how to wash the endoscope or simply to have an understanding of the process? Learning should also incorporate improvements in service delivery and overall clinical care of our patients. However, to identify our own gaps in knowledge, skills and behaviours can be challenging. As a trainee, core curricula for training posts help as a baseline but in addition we can ask colleagues and patients for their feedback. As a senior, we can use comparative data from our work against local and national standards. Looking at learning needs more widely as we progress in our medical careers, we need to take into account our organisations' needs and service commitments, wherein our learning and development can be linked to strategic planning as well as our own personal needs. Identifying our learning needs is the first step in ensuring we continue to improve in our performance as doctors.

Identifying learning opportunities: how to make these appropriate to our needs and learning style

It is important that we are aware of the opportunities and experiences that we can gain while in a particular job or role to help us improve our skills. Skills will be both generic and specific and are likely to include practical skills with opportunities for task-orientated practice as is the case with endoscopy training. With this knowledge we can plan our learning based on our needs and learning style. To help us identify opportunities we can consider relevant assessment criteria and relate potential learning to it. We can ask colleagues and peers about their experiences within an organisation and the wider community. While it is important to know what is available in the workplace to be able to identify the opportunities for our own training, recognised training posts in medicine are monitored to ensure that appropriate training facilities exist for expected curricula outcomes at that training level.

Box 1 Jung's theory of psychological types to categorise personality patterns focuses on four basic psychological functions

1. Extroversion versus introversion
2. Sensation versus intuition
3. Thinking versus feeling
4. Judging versus perceiving

Box 2 Method of identifying learning needs

- ▶ Where are we now?
- ▶ What are our roles and responsibilities?
- ▶ What do we need to know for our role and position?
- ▶ What knowledge, skills and behaviours do we need?

The perception of those training facilities as a learning environment, however, can be very dependent on a number of factors including an individual's ability to learn along with the effectiveness of their learning.

Consolidating the learning

There are a number of ways we can consolidate our learning.

Relating learning to previous experience

Relating learning to previous experience is a key factor. Researchers⁷ have shown that experience helps when we have to make complex decisions based on uncertain or confusing information. They show that learning from past experience changes the circuitry in our brains, rewires it in effect, so that we can quickly categorise what we are seeing, enabling us to make a decision or carry out appropriate actions. They suggest that learnt information about categories is retained in circuits in the posterior brain and fed through to circuits in frontal areas, allowing the information to be translated into flexible decisions and appropriate actions depending on the requirements and context of the task. The improved efficiency and accuracy of a post-take ward round led by an experienced consultant springs to mind. Practical point: refer to previous cases or similar situations or conditions when teaching new material or thinking about it yourself.

Repetition and reinforcement

Practice, or repetition, increases the strength and speed of learning, although the effects of repetition are related to the weight given to the importance of the information as well as the reinforcement given. The more important it is for a doctor to learn a particular task or information, the more effective they become in the learning process. Cue the knowledge that a particular subject will come up in an exam or that the knowledge is required to manage a life-threatening scenario. To reinforce to trainees that they are performing a task correctly and well (or incorrectly and poorly) will have a significant impact on the speed at which learning occurs as well as the duration of its effect. Practical points: ask learners what they have learnt at the end of the round or clinic; give specific feedback routinely; ask yourself the same questions.

Applying it

Learning is enhanced when learners have time to reflect on their training, and it is important to factor in time for this to occur in the learning process. To facilitate the recognition of learning that has already been achieved, a review of, for example, relevant notes, work-based assessments or self-assessments may be helpful. This, together with any additional learning and developmental needs that may have been uncovered by the previous experiences will help ensure that the learning process can be expanded in a step-wise way dependent on the learner and current progress. Junior doctors are supported through their training

by, for example, their educational supervisors who can facilitate and guide them to achieve their learning objectives. Trainees need to be encouraged and supported in practising their new learning and skills and given the time and opportunity to put their learning into practice because new learning is more readily consolidated if applied immediately after the training. Practical point: consolidate learning and evaluate the effectiveness of your teaching by continually stretching your trainees.

Teaching it

Teaching on topics that we have previously learnt helps consolidate our personal learning further, but how we teach the topic remains pivotal in optimising the learning process for our learners in order to perpetuate the cycle of effective learning. For example, introducing new information without time for consolidation or reflection is likely to result in poor processing of that information and learners may struggle to commit the information to memory.⁸ We can facilitate learning in a number of ways when we teach, such as by using structured repetition of topics that will reinforce learning or pacing our teaching to avoid information overload with opportunities for questions and interaction. Practical point: ask senior trainees to explain problems or principles to junior trainees or medical students while you listen; do the same for colleagues in multidisciplinary teams—'think aloud' is effective.

A practical example

Using the example of a newly appointed consultant in gastroenterology an illustration of how learning can be viewed and optimised throughout their career is given below.

Identifying learning needs

Where am I now?

I am a fully accredited doctor trained in gastroenterology. I bring with me my previous general and gastrointestinal medical experience and am fully trained to perform basic upper and lower therapeutic gastrointestinal endoscopy. My previous experience may include areas in research, advanced endoscopy, nutrition or liver disease and I may wish to pursue further learning opportunities in an area of special interest or within a subsequently identified service development need.

What are my roles and responsibilities?

There will be many elements to my new job involving both clinical and non-clinical overlapping roles and responsibilities.

As part of the general medical unselected take I require a sound knowledge of general medicine and the management of acute medical emergencies and must keep my knowledge updated. Likewise, I will be an active upper and lower endoscopist and will need skills to train future endoscopists. I will be expected to perform specific emergency interventions such as

the insertion of the Sengstaken–Blakemore tube and must ensure my endoscopic skills are maintained. I may wish to become more ‘expert’ in the management of specific gastrointestinal diseases and may wish to develop a dedicated clinic for such development.

As this role is my most senior one to date, leadership, communication and organisation skills are required and attendance at senior courses will help consolidate and develop these skills.

What do I need to know?

As a new consultant I need an awareness of where and how my particular skill set and personality type fits in and complements those of my colleagues. I need an understanding of the clinical case-mix and population demographics, the particular strengths and weaknesses of the department and the trust’s view on potential new service developments. I need to be aware that as a consultant I still have learning needs and always will, often notably that my practical skills can improve further with increased exposure and development of more advanced endoscopic skills.

What knowledge, skills and behaviours do I need?

These are probably covered in my job specification but include maintaining knowledge of best practice guidelines, referral pathways and local networks, as well as keeping up to date with current thinking. I will need to review feedback on my performance, and look for appropriate ways to improve on the identified needs. If I am going to meet fully my patients’ and the trust’s expectations of a highly trained professional I need initiative, enthusiasm and an awareness of the balance between service needs of the organisation and my personal training needs.

What is my learning style?

Ideally, I already have insight into my own personality type and methodology of how best I learn. I have already achieved success in exams and interviews demonstrating successful application of my knowledge and practice. Opportunities in higher specialty training have enabled me to build on and improve my learning techniques. The key to ongoing and efficient learning is for me to identify specific learning opportunities that arise through awareness of particular personal or trust-wide development needs, in clinical, teaching or managerial arenas.

Identifying learning opportunities

I need to understand the context of the hospital and services offered to marry up my individual training needs with the requirements of the post and the trust’s expectations. Discussion with current colleagues about their experiences would be helpful. What are the opportunities for me to learn a new skill, further develop my current research interest or pursue my teaching interest, and how do these fit with the organisation’s strategy? How do these match my current career interests and desires?

What are these likely to be in the future? What would be the immediate clinical benefits to the hospital as well as to my colleagues if I pursued, for example, the development of a dedicated specialist gastrointestinal clinic? What courses are available locally or nationally to help me with developing a future senior management role, and would a mentor work for me? If so, who would be best? I need to be aware of the fact that I may need to push myself deliberately out of my comfort zone and preferred learning style on occasion—even though I am very averse to it, perhaps it is only by role play that I truly learn how to break bad news well.

Examples of learning opportunities are illustrated in box 3.

Consolidating the learning

As a consultant in gastroenterology I will be exposed to increasing numbers of patients and more specialty-specific patients enabling me to relate back to previous experience in a more efficient way as my experience builds in parallel to the suggested changes in brain circuitry previously described.

With regular endoscopy lists, I have the opportunity to maintain and improve my endoscopic skills, especially if I get feedback, reflect on my practice, and avail myself of some of the interactive training courses. Completion of regular appraisals with ongoing mentoring and colleague feedback will encourage the correct application of learnt skills.

Finally, how to ensure an essential but rarely required skill, such as Sengstaken–Blakemore tube placement, has been learnt and retained? One way to consolidate learning for me would be to teach others, using the kit and models, on a regular basis.

Box 3 Examples of basic and more advanced learning opportunities

Basic

- ▶ Learn and teach on the management of more complex gastrointestinal conditions and place into practice
- ▶ Attendance at multidisciplinary team meetings—build on experience and awareness of the more complicated cases. Learn from more senior colleagues
- ▶ Attendance at courses aimed at senior clinical staff regarding communication, managerial or appraisal skills

More specific

- ▶ Spend time with your colorectal colleagues, possibly attend a theatre session
- ▶ Ensure or write up-to-date local guidelines for procedures and/or interventions, for example, Sengstaken–Blakemore tube insertion
- ▶ Always remember to put yourself in the patient’s shoes with a chronic gastrointestinal condition to influence how you might continue to improve your communication to them of the condition
- ▶ Lead on the development of a new gastrointestinal department service (eg, implementation of a nutrition round, development of a breath test service)

Conclusion

The evidence for ongoing cerebral stimulation improving function as well as structural brain changes being stimulated by complex tasks adds weight to theories of learning inducing brain changes at both a macroscopic and possibly a microscopic level. This knowledge should help motivate us in our practice such that we can incorporate the very necessary life-long learning techniques discussed in our everyday professional lives.

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